

Supplement to BART Analysis for Centralia Power Plant

TransAlta Centralia Generation LLC (“TransAlta”)

November 2008

The “BART Analysis for Centralia Power Plant” prepared for TransAlta by CH2M Hill (July 2008) (“BART Analysis”) concludes that the Centralia Plant’s current LNC3 technology is BART for nitrogen oxide (“NOx”) emissions. The Centralia Power Plant’s current Air Operating Permit (SW98-8-R2-B) limit for NOx is 0.30 lb/mmBtu (annual average). Projected emissions following completion of the “Flex Fuel Project,” the Centralia Plant’s switch to Powder River Basin coal, support a BART limit of 0.24 lb/mmBtu (rolling 30-day average). The proposed BART limit would equal a 20 percent NOx reduction.

This supplement to the BART Analysis provides additional information and data supporting a BART limit for NOx of 0.24 lb/mmBtu.

I. Flex Fuel Project

Since the closure of its local Centralia Mine in 2006, TransAlta has been evaluating various sources of coal from the Powder River Basin (“PRB”) of Wyoming and Montana for use in its boilers at the Centralia Plant. TransAlta has burned blends of local and PRB coal in the past, but is now likely to burn 100 percent PRB coal. The PRB coals are “cleaner” in several respects than local coals, *e.g.*, lower sulfur, ash and nitrogen contents. To address the specific characteristics of PRB coal, TransAlta is implementing several safety and boiler efficiency projects. The Flex Fuel Project was implemented for Unit 2 during 2008 and for Unit 1 is planned for the spring of 2009.

A. Description

The slagging and fouling characteristics of PRB coal increase the heat rates of the boilers compared with Centralia Mine coal. The Flex Fuel Project incorporates physical changes to the pressure parts in each boiler’s convective pass that improve heat transfer. No changes to the fuel delivery equipment, burners, combustion air system, or steam turbine are being made. The Flex Fuel Project allows the boilers to burn PRB coal more efficiently, but does not increase the boilers’ potential steam generating capacity.

The boiler changes will reduce the boiler susceptibility to ash deposition. The major individual pressure part changes include: (a) reheat replacement to maximize sootblower cleaning effectiveness on the tube assembly surface areas, and (b) additional low temperature superheater and economizer heat transfer surface area to result in a lower flue gas exit temperature. Miscellaneous safety and nonpressure boiler changes include: (a) twenty new retractable steam sootblowers and eight new steam wallblowers for each unit to help reduce the slagging and fouling in the boiler furnace and convective heat transfer surfaces; (b) hydrojets cleaning system to maintain heat transfer effectiveness inside the furnace and lower the flue exhaust gas temperature.

Because the Centralia Units currently utilize LNC3 low-NOx burners, no changes to the current NOx controls are planned for the Flex Fuel Project, only routine maintenance of the low-NOx equipment will be performed. The Flex Fuel Project is, however, expected to enable reductions in overall NOx emissions by:

1. use of lower fuel Nitrogen content coals,
2. improved boiler firing condition flexibility through reduced boiler exit gas temperatures allowing optimized use of the LNC3 separated over-fire air (SOFA) low-NOx equipment. (e.g. boiler exit gas temperatures reduced due to improved boiler sootblowing, hydrojets and heat transfer area improvements),
3. vendor engineering support and contractual boiler NOx performance guarantees enabled by reduced boiler exit gas temperatures, and
4. vendor boiler combustion “tuning” support during Flex Fuel Project commissioning, including support on use of current low-NOx equipment.

B. PRB Coal Characteristics

Table 4 (attached) compares the key characteristics of the Centralia Mine coal that has historically been the primary coal with those of example PRB coals.

II. PROJECTED POST-FLEX FUEL PROJECT EMISSIONS

Tables 1, 2, and 3 provide the modeled post-Flex Fuel Project emission rates at maximum potential sustainable load (663 MW) for one of the PRB coals evaluated by TransAlta. The emission rates were modeled using Vista software. (Black & Veatch, “TransAlta Centralia Boiler Emissions Modeling Study” (Sept. 2007)). Vista quantifies the performance impacts associated with burning alternate coals in a power plant. (For more information about Vista, visit <http://www.myvistasource.com/index.htm>.)

Table 1 Projected Hourly Emission Rates		
Description	Units	Cordero Rojo
Max Potential Sustainable Load Unit Operation		
Gross Power	MW	709.15
Net Power	MW	663.00
Aux Power	MW	46.15
Net Unit Heat Rate	Btu/kWh	10,611
Coal Burn Rate	ton/hr	415.68
Coal Burn Rate	lbm/hr	831,360
Coal Burn Rate	mmBtu/hr	7,030
Boiler Efficiency	%	83.76
Stack Emission		
SO ₂ Emissions	lbm/mmBtu	0.068
SO ₂ Emissions	lbm/hr	478
NO _x Emissions	lbm/mmBtu	0.240
NO _x Emissions	lbm/hr	1,690
CO Emission	lbm/mmBtu	0.085
CO Emission	lbm/hr	595

Table 2 – Projected Annual Emissions for Unit 1		
Description	Units	Cordero Rojo
Maintenance Year		
Total Hours in Year	Hr	8760
Operating Hours	Hr	7399
Annual Net Generation	GWh/yr	4,906
Annual Fuel Burn Rate	kton/yr	3,076
Annual SO ₂ Emitted	ton/yr	1,769
Annual NO _x Emitted	ton/yr	6,253
Annual CO	ton/yr	2,200
Non-Maintenance Year		
Total Hours in Year	Hr	8784
Operating Hours	Hr	8182
Annual Net Generation	GWh/yr	5,425
Annual Fuel Burn Rate	kton/yr	3,401
Annual SO ₂ Emitted	ton/yr	1,956
Annual NO _x Emitted	ton/yr	6,915
Annual CO Emitted	ton/yr	2,433

Table 3 – Projected Annual Emissions for Unit 2		
Description	Units	Cordero Rojo
Maintenance Year		
Total Hours in Year	Hr	8760
Operating Hours	Hr	7614
Annual Net Generation	GWh/yr	5,048
Annual Fuel Burn Rate	kton/yr	3,165
Annual SO ₂ Emitted	ton/yr	1,820
Annual NO _x Emitted	ton/yr	6,435
Annual CO	ton/yr	2,264
Non-Maintenance Year		
Total Hours in Year	Hr	8784
Operating Hours	Hr	8159
Annual Net Generation	GWh/yr	5,409
Annual Fuel Burn Rate	kton/yr	3,392
Annual SO ₂ Emitted	ton/yr	1,951
Annual NO _x Emitted	ton/yr	6,896
Annual CO Emitted	ton/yr	2,426

III. Flex Fuel Project’s Emission Reductions

The Department of Ecology’s BART Guidelines provide that the baseline emissions for determining cost-effectiveness of a proposed BART limit is based normally on the last 8 quarters of continuous emission monitoring (CEM) data, but allow a plant to “demonstrate that one of those years was not representative of normal operation.” (“Best Available Retrofit Technology Determinations under the Federal Regional Haze Rule,” p. 21). The BART Analysis (July 2008) uses the annual average data from 2006 and 2007 for the cost-effectiveness analysis. However, for several reasons, that period is not representative of the Centralia Plant’s emissions for purposes of estimating post-Flex Fuel Project emissions.

In general, emissions during the 2006 - 2007 period were lower on average than more representative periods. The lower average emissions are due to several factors. The capacity factor during that period was lower than historical, meaning that the Plant operated less and generated less electricity during that period. The Plant was testing a variety of PRB coals, which caused emissions variability and provides an uncertain basis for projecting future emissions. Finally, the final emission rates of the Flex Fuel project will not be known until after Unit 1 installation is completed in 2009. For these reasons, there is too much uncertainty to rely on the 2006 – 2007 period as the baseline for calculating Flex Fuel Project emission reductions.

The more appropriate baseline emission rate would be 0.30 lb/mmBtu. The most important reason for using 0.30 lb/mmBtu as the baseline for evaluating the proposed BART emission limit is that the BART limit will be enforced as a 30-day rolling average, and, by contrast, the 2006 – 2007 baseline was an annual average. The emission data in Table 5 (attached) demonstrates that the Centralia Plant’s 30-day rolling average emissions from 2003 through 2007 were in the range of 0.28 to 0.29 lb/mmBtu during numerous periods. Based on this data, a conservative approach assumes that the Plant’s baseline 30-day rolling average emission rate is 0.30 lb/mmBtu for purposes of evaluating and setting BART limits. This rate also roughly corresponds to the maximum hourly emission rate of 0.304 lb/mmBtu during the 2003 – 2005 period, which is the baseline rate used in ENVIRON’s (formerly Geomatrix) visibility modeling for the BART Analysis and for this supplement (see attached Tables).

One method for estimating NOx reductions is to compare the projected annual Flex Fuel Project emissions to the annual average emissions during the 2003 – 2005 baseline. Annual average NOx emissions from December 1, 2003 through November 31, 2005 were 15,695 tons. Based on the ratio of the baseline emission rate of 0.30 lb/mmBtu to the proposed BART rate of 0.24 lb/mmBtu (20% reduction), the BART limit would reduce emissions by 3139 tons/year to 12,556 tpy.

IV. Flex Fuel Project Cost and Cost-Effectiveness

Table 6 (attached) provides the total costs of the Flex Fuel Project. The annualized cost of the Flex Fuel Project is \$11,184,197.00. Based on the estimated NOx reductions of 3139 tons/yr., the cost-effectiveness of the Flex Fuel Project is \$3563/ton. The Flexible Fuel Project also reduces SO2 emissions by an estimated 1287 tons/year. Based on NOx and SO2 reductions, the cost-effectiveness of the Flex Fuel Project is \$2526/ton.

V. Visibility Modeling Results for Proposed BART Limit

At TransAlta’s request, ENVIRON modeled the proposed BART limit of 0.24 lb/mmBtu for comparison with the other control technologies considered in the BART Analysis. The results in the attached “Tables” (ENVIRON, Oct. 2008) confirm that the projected NOx reductions will improve visibility in Class I areas independently of the SO2 benefits from switching to PRB coal.

VI. Proposed BART Limit is Comparable to SNCR

For the reasons stated above for using 0.30 lb/mmBtu as the baseline for estimating emission reductions from the Flex Fuel Project, it is appropriate to use the same baseline for projecting emissions from installation of SNCR at the Centralia Plant.

Based on CH2M Hill's recommendation in the BART Analysis of a 25 percent reduction factor for SNCR, projected emissions would be .23 lb/mmBtu, which is basically equivalent to the proposed BART limit of 0.24 lb/mmBtu.

ENVIRON's visibility modeling (attached Tables) confirms that the visibility improvement from the proposed BART limit and SNCR are virtually identical. The modeled number of days greater than 0.5 deciviews at Mount Rainier National Park for the 0.24 lb/mmBtu limit is 488, and for SNCR is 484. These compare with 505 days of impairment for the baseline emission rate.

VII. Proposed Effective Date of BART Emission Limit

The Flex Fuel Project will be completed for Unit 1 in or about June 2009. Several months of testing and tuning are necessary for optimum operation. Both units should be prepared to meet the BART limits by the end of September 2009. TransAlta proposes October 1, 2009 as the first day of the 30-day rolling averaging period and midnight of October 30 as the first compliance date.

VIII. Conclusion

Based on recent operating experience and the Flex Fuel Project modeled emission estimates, 0.24 lb/mmBtu is the appropriate BART limit for NOx. The projected emission reductions following the switch to PRB coal and accompanying boiler projects meet the BART requirement. This BART limit is nearly the same as an SNCR emission rate and would achieve nearly the same visibility improvement. EPA acknowledges that fuel switching is a legitimate technology for setting BART limits. See 2007 letter from EPA Region 8 to PPL Montana, LLC re: "Best Available Retrofit Technology Assessment J.E. Corette Generating Station." Although this limit will be met in part by switching to PRB coal, the primary NOx control technology to meet this limit will continue to be the LNC3 and over-fire air installed from 2000 through 2002.

Table 4
Coal Sources and Characteristics

Coal Quality Data	Units	Buckskin	Caballo 8500	Cordero Rojo	Jacobs Ranch Upper Wyodak	Rawhide	Special K Fuel	Belle Ayr	Eagle Butte
Proximate Analysis (As-Received Basis)									
Higher Heating Value	Btu/lb	8400.00	8500.00	8456.00	8800.00	8300.00	7907.00	8500.00	8400.00
Moisture	%	29.95	29.90	29.61	26.45	30.50	25.74	30.50	30.50
Volatile Matter	%	30.25	31.40	30.71	32.50	30.40	28.76	30.40	31.92
Fixed Carbon	%	34.65	33.80	34.22	34.35	34.20	32.46	34.20	32.93
Ash	%	5.15	4.90	5.46	6.70	4.90	13.04	4.90	4.65
Fixed Carbon to Volatile Matter (Fuel) Ratio		1.15	1.08	1.11	1.06	1.13	1.13	1.12	1.03
Ultimate Analysis (As-Received Basis)									
Carbon	%	49.00	49.91	49.16	51.26	48.58	45.82	50.01	49.17
Hydrogen	%	3.24	3.56	3.43	3.89	3.34	3.07	3.43	3.42
Nitrogen	%	0.63	0.71	0.71	0.80	0.63	0.56	0.67	0.67
Sulfur	%	0.35	0.36	0.32	0.88	0.37	0.28	0.26	0.38
Ash	%	5.15	4.90	5.46	6.70	4.90	13.04	4.90	4.65
Moisture	%	29.95	29.90	29.61	26.45	30.50	25.74	30.50	30.50
Chlorine	%	0.00	0.00	0.00	0.01	0.01	0.00	0.01	0.01
Oxygen	%	11.68	10.66	11.31	10.01	11.68	11.49	11.12	11.20

Note: Special K Fuel is blend of Spring Creek and Kaolin coals

Table 5: Centralia Plant, 30-day Rolling NOx Emission Rates Greater than 0.275 lb/mmBtu

Date	Unit 1 30 day rolling average	Unit 2 30 day rolling average	Combined 30 day rolling average	Notes
05/31/2003 23:00	0.285	0.265	0.276	
06/01/2003 23:00	0.293	0.264	0.279	
06/02/2003 23:00	0.295	0.262	0.279	
06/03/2003 23:00	0.296	0.262	0.279	
06/04/2003 23:00	0.296	0.263	0.280	
06/05/2003 23:00	0.295	0.263	0.279	
06/06/2003 23:00	0.294	0.263	0.279	
06/07/2003 23:00	0.294	0.263	0.279	
06/08/2003 23:00	0.294	0.263	0.279	
06/09/2003 23:00	0.297	0.262	0.280	
06/10/2003 23:00	0.296	0.261	0.279	
06/11/2003 23:00	0.297	0.261	0.279	
06/12/2003 23:00	0.296	0.259	0.278	
06/13/2003 23:00	0.297	0.259	0.278	
06/14/2003 23:00	0.297	0.258	0.278	
06/15/2003 23:00	0.296	0.257	0.277	
06/16/2003 23:00	0.295	0.257	0.276	
06/17/2003 23:00	0.293	0.258	0.276	
06/18/2003 23:00	0.292	0.258	0.275	
06/19/2003 23:00	0.292	0.258	0.275	
06/20/2003 23:00	0.291	0.258	0.275	
08/02/2003 23:00	0.303	0.247	0.275	
08/03/2003 23:00	0.304	0.249	0.277	
08/04/2003 23:00	0.304	0.251	0.277	

Date	Unit 1 30 day rolling average	Unit 2 30 day rolling average	Combined 30 day rolling average	Notes
08/12/2003 23:00	0.309	0.259	0.282	
08/13/2003 23:00	0.309	0.260	0.282	
08/14/2003 23:00	0.309	0.261	0.283	
08/15/2003 23:00	0.308	0.262	0.283	
08/16/2003 23:00	0.309	0.263	0.284	
08/17/2003 23:00	0.309	0.264	0.284	
08/18/2003 23:00	0.309	0.264	0.284	
08/19/2003 23:00	0.309	0.264	0.284	
08/20/2003 23:00	0.310	0.264	0.285	
08/21/2003 23:00	0.311	0.266	0.286	
08/22/2003 23:00	0.310	0.266	0.285	
08/23/2003 23:00	0.309	0.265	0.284	
08/24/2003 23:00	0.307	0.264	0.282	
08/25/2003 23:00	0.305	0.263	0.281	
08/26/2003 23:00	0.305	0.263	0.281	
08/27/2003 23:00	0.304	0.263	0.280	
08/28/2003 23:00	0.303	0.262	0.280	
08/29/2003 23:00	0.303	0.263	0.280	
08/30/2003 23:00	0.302	0.261	0.278	
08/31/2003 23:00	0.302	0.261	0.278	
09/01/2003 23:00	0.301	0.259	0.276	
09/17/2003 23:00	0.294	0.266	0.278	
09/18/2003 23:00	0.293	0.269	0.279	
09/19/2003 23:00	0.292	0.268	0.279	

Date	Unit 1 30 day rolling average	Unit 2 30 day rolling average	Combined 30 day rolling average	Notes
08/05/2003 23:00	0.303	0.252	0.277	
08/06/2003 23:00	0.303	0.253	0.277	
08/07/2003 23:00	0.304	0.255	0.278	
08/08/2003 23:00	0.304	0.256	0.278	
08/09/2003 23:00	0.304	0.256	0.279	
08/10/2003 23:00	0.306	0.257	0.279	
08/11/2003 23:00	0.308	0.258	0.281	
09/27/2003 23:00	0.291	0.273	0.282	
09/28/2003 23:00	0.292	0.274	0.283	
09/29/2003 23:00	0.291	0.275	0.282	
09/30/2003 23:00	0.290	0.275	0.282	
10/01/2003 23:00	0.290	0.275	0.282	
10/02/2003 23:00	0.290	0.274	0.282	
10/03/2003 23:00	0.290	0.274	0.282	
10/04/2003 23:00	0.290	0.274	0.282	
10/05/2003 23:00	0.290	0.275	0.282	
10/06/2003 23:00	0.290	0.277	0.283	
10/07/2003 23:00	0.291	0.278	0.284	
10/08/2003 23:00	0.289	0.280	0.285	
10/09/2003 23:00	0.290	0.282	0.286	
10/10/2003 23:00	0.290	0.283	0.286	
10/11/2003 23:00	0.290	0.283	0.287	
10/12/2003 23:00	0.290	0.283	0.286	
10/13/2003 23:00	0.290	0.283	0.286	
10/14/2003 23:00	0.290	0.283	0.286	
10/15/2003 23:00	0.289	0.282	0.286	

Date	Unit 1 30 day rolling average	Unit 2 30 day rolling average	Combined 30 day rolling average	Notes
09/20/2003 23:00	0.290	0.267	0.278	
09/21/2003 23:00	0.290	0.267	0.278	
09/22/2003 23:00	0.291	0.272	0.281	
09/23/2003 23:00	0.291	0.272	0.281	
09/24/2003 23:00	0.291	0.271	0.281	
09/25/2003 23:00	0.292	0.272	0.281	
09/26/2003 23:00	0.292	0.272	0.281	
05/26/2004 23:00	0.284	0.278	0.281	
05/27/2004 23:00	0.284	0.284	0.284	
05/28/2004 23:00	0.284	0.279	0.281	
05/29/2004 23:00	0.284	0.273	0.279	
05/30/2004 23:00	0.284	Off	0.284	Unit 1 only
05/31/2004 23:00	0.283	Off	0.283	Unit 1 only
06/01/2004 23:00	0.282	Off	0.282	Unit 1 only
06/02/2004 23:00	0.283	Off	0.283	Unit 1 only
06/03/2004 23:00	0.283	Off	0.283	Unit 1 only
06/04/2004 23:00	0.282	Off	0.282	Unit 1 only
06/05/2004 23:00	0.282	Off	0.282	Unit 1 only
06/06/2004 23:00	0.281	Off	0.281	Unit 1 only
06/07/2004 23:00	0.280	Off	0.280	Unit 1 only
01/09/2005 23:00	0.275	0.276	0.275	
01/10/2005 23:00	0.275	0.276	0.276	
01/11/2005 23:00	0.275	0.280	0.278	
01/12/2005 23:00	0.276	0.279	0.278	
01/13/2005 23:00	0.278	0.279	0.279	
01/14/2005 23:00	0.279	0.279	0.279	

Date	Unit 1 30 day rolling average	Unit 2 30 day rolling average	Combined 30 day rolling average	Notes
10/16/2003 23:00	0.289	0.281	0.285	
10/17/2003 23:00	0.289	0.278	0.283	
10/18/2003 23:00	0.288	0.274	0.280	
10/19/2003 23:00	0.287	0.273	0.280	
10/20/2003 23:00	0.287	0.272	0.279	
10/21/2003 23:00	0.286	0.272	0.279	
10/22/2003 23:00	0.285	0.269	0.276	
10/23/2003 23:00	0.285	0.267	0.275	
05/20/2004 23:00	0.280	0.270	0.275	
05/21/2004 23:00	0.279	0.271	0.275	
05/22/2004 23:00	0.279	0.272	0.276	
05/23/2004 23:00	0.281	0.275	0.278	
05/24/2004 23:00	0.283	0.277	0.280	
05/25/2004 23:00	0.283	0.277	0.280	
01/29/2005 23:00	0.277	0.290	0.283	
01/30/2005 23:00	0.277	0.290	0.284	
01/31/2005 23:00	0.278	0.291	0.285	
02/01/2005 23:00	0.280	0.293	0.286	
02/02/2005 23:00	0.279	0.294	0.287	
02/03/2005 23:00	0.279	0.297	0.288	
02/04/2005 23:00	0.278	0.300	0.289	
02/05/2005 23:00	0.279	0.300	0.290	
02/06/2005 23:00	0.279	0.304	0.291	
02/07/2005 23:00	0.279	0.312	0.295	
02/08/2005 23:00	0.278	0.323	0.300	
02/09/2005 23:00	0.276	0.318	0.297	

Date	Unit 1 30 day rolling average	Unit 2 30 day rolling average	Combined 30 day rolling average	Notes
01/15/2005 23:00	0.279	0.280	0.280	
01/16/2005 23:00	0.279	0.281	0.280	
01/17/2005 23:00	0.278	0.281	0.279	
01/18/2005 23:00	0.277	0.281	0.279	
01/19/2005 23:00	0.277	0.281	0.279	
01/20/2005 23:00	0.276	0.281	0.278	
01/21/2005 23:00	0.276	0.282	0.279	
01/22/2005 23:00	0.275	0.283	0.279	
01/23/2005 23:00	0.275	0.283	0.279	
01/24/2005 23:00	0.276	0.284	0.280	
01/25/2005 23:00	0.276	0.286	0.281	
01/26/2005 23:00	0.277	0.288	0.282	
01/27/2005 23:00	0.277	0.290	0.283	
01/28/2005 23:00	0.276	0.290	0.283	
03/04/2005 23:00	0.274	0.282	0.278	
03/05/2005 23:00	0.273	0.282	0.278	
03/06/2005 23:00	0.273	0.282	0.278	
03/07/2005 23:00	0.273	0.279	0.276	
03/08/2005 23:00	0.273	0.277	0.275	
03/10/2005 23:00	0.275	0.275	0.275	
03/11/2005 23:00	0.276	0.274	0.275	
03/12/2005 23:00	0.277	0.273	0.275	
03/13/2005 23:00	0.277	0.273	0.275	
03/17/2005 23:00	0.277	0.274	0.276	
03/18/2005 23:00	0.277	0.276	0.276	
03/19/2005 23:00	0.278	0.277	0.277	

Date	Unit 1 30 day rolling average	Unit 2 30 day rolling average	Combined 30 day rolling average	Notes
02/11/2005 23:00	0.275	0.293	0.284	
02/12/2005 23:00	0.276	Off	0.276	Unit 1 only
02/13/2005 23:00	0.275	Off	0.275	Unit 1 only
02/14/2005 23:00	0.275	Off	0.275	Unit 1 only
02/15/2005 23:00	0.276	Off	0.276	Unit 1 only
02/16/2005 23:00	0.277	Off	0.277	Unit 1 only
02/17/2005 23:00	0.277	Off	0.277	Unit 1 only
02/18/2005 23:00	0.277	Off	0.277	Unit 1 only
02/19/2005 23:00	0.278	Off	0.278	Unit 1 only
02/20/2005 23:00	0.278	Off	0.278	Unit 1 only
02/21/2005 23:00	0.277	Off	0.277	Unit 1 only
02/22/2005 23:00	0.276	Off	0.276	Unit 1 only
02/23/2005 23:00	0.275	Off	0.275	Unit 1 only
02/24/2005 23:00	0.275	Off	0.275	Unit 1 only
02/25/2005 23:00	0.274	0.286	0.280	
02/26/2005 23:00	0.274	0.289	0.281	
02/27/2005 23:00	0.273	0.286	0.279	
02/28/2005 23:00	0.273	0.277	0.275	
03/01/2005 23:00	0.273	0.278	0.276	
03/02/2005 23:00	0.274	0.279	0.277	
03/03/2005 23:00	0.275	0.282	0.278	
04/10/2005 23:00	0.284	0.279	0.282	
04/11/2005 23:00	0.284	0.281	0.282	
04/12/2005 23:00	0.283	0.281	0.282	
04/13/2005 23:00	0.283	0.281	0.282	
04/14/2005 23:00	0.283	0.281	0.282	

Date	Unit 1 30 day rolling average	Unit 2 30 day rolling average	Combined 30 day rolling average	Notes
03/20/2005 23:00	0.278	0.278	0.278	
03/21/2005 23:00	0.278	0.278	0.278	
03/22/2005 23:00	0.278	0.278	0.278	
03/23/2005 23:00	0.279	0.279	0.279	
03/24/2005 23:00	0.280	0.279	0.280	
03/25/2005 23:00	0.282	0.278	0.280	
03/26/2005 23:00	0.282	0.278	0.280	
03/27/2005 23:00	0.281	0.278	0.279	
03/28/2005 23:00	0.281	0.277	0.279	
03/29/2005 23:00	0.282	0.277	0.280	
03/30/2005 23:00	0.283	0.278	0.280	
03/31/2005 23:00	0.284	0.277	0.281	
04/01/2005 23:00	0.284	0.276	0.280	
04/02/2005 23:00	0.284	0.276	0.280	
04/03/2005 23:00	0.285	0.276	0.281	
04/04/2005 23:00	0.286	0.276	0.281	
04/05/2005 23:00	0.286	0.276	0.281	
04/06/2005 23:00	0.286	0.277	0.281	
04/07/2005 23:00	0.285	0.277	0.281	
04/08/2005 23:00	0.284	0.278	0.281	
04/09/2005 23:00	0.285	0.278	0.282	
05/30/2005 23:00	0.529	0.272	0.360	
05/31/2005 23:00	0.423	0.269	0.321	
06/01/2005 23:00	0.317	0.268	0.286	
06/02/2005 23:00	0.300	0.267	0.279	
06/03/2005 23:00	0.291	0.266	0.276	

Date	Unit 1 30 day rolling average	Unit 2 30 day rolling average	Combined 30 day rolling average	Notes
04/15/2005 23:00	0.283	0.281	0.282	
04/16/2005 23:00	0.283	0.280	0.282	
04/17/2005 23:00	0.282	0.279	0.281	
04/18/2005 23:00	0.282	0.279	0.280	
04/19/2005 23:00	0.282	0.278	0.280	
04/20/2005 23:00	0.281	0.278	0.280	
04/21/2005 23:00	0.281	0.278	0.279	
04/22/2005 23:00	0.280	0.276	0.278	
04/23/2005 23:00	0.279	0.276	0.277	
04/24/2005 23:00	0.279	0.275	0.277	
04/25/2005 23:00	0.279	0.274	0.277	
04/26/2005 23:00	0.280	0.273	0.276	
04/27/2005 23:00	0.280	0.272	0.276	
04/28/2005 23:00	0.280	0.271	0.275	
05/07/2005 23:00	0.280	0.271	0.276	
05/08/2005 23:00	0.281	0.271	0.276	
05/10/2005 23:00	0.281	0.270	0.275	
05/13/2005 23:00	0.283	0.268	0.275	
05/14/2005 23:00	0.283	0.268	0.275	
05/15/2005 23:00	0.284	0.267	0.276	
11/21/2005 23:00	0.274	0.277	0.276	
11/22/2005 23:00	0.276	0.277	0.277	
11/23/2005 23:00	0.277	0.278	0.277	
11/24/2005 23:00	0.277	0.278	0.278	
11/25/2005 23:00	0.277	0.277	0.277	
11/26/2005 23:00	0.277	0.276	0.277	

Date	Unit 1 30 day rolling average	Unit 2 30 day rolling average	Combined 30 day rolling average	Notes
09/18/2005 23:00	0.276	0.274	0.275	
09/24/2005 23:00	0.280	0.271	0.275	
09/25/2005 23:00	0.281	0.271	0.276	
09/26/2005 23:00	0.282	0.272	0.277	
09/27/2005 23:00	0.283	0.272	0.277	
09/28/2005 23:00	0.283	0.272	0.277	
09/29/2005 23:00	0.283	0.271	0.277	
09/30/2005 23:00	0.282	0.271	0.276	
10/01/2005 23:00	0.282	0.269	0.275	
10/31/2005 23:00	0.279	0.272	0.276	
11/01/2005 23:00	0.279	0.275	0.277	
11/02/2005 23:00	0.279	0.279	0.279	
11/03/2005 23:00	0.278	0.282	0.280	
11/04/2005 23:00	0.277	0.283	0.280	
11/05/2005 23:00	0.277	0.283	0.280	
11/06/2005 23:00	0.276	0.280	0.278	
11/07/2005 23:00	0.276	0.278	0.277	
11/08/2005 23:00	0.277	0.278	0.277	
11/09/2005 23:00	0.276	0.278	0.277	
11/10/2005 23:00	0.276	0.278	0.277	
11/18/2006 23:00	0.282	0.244	0.275	
11/19/2006 23:00	0.283	0.244	0.276	
11/20/2006 23:00	0.283	0.244	0.276	
11/21/2006 23:00	0.283	0.246	0.277	
11/22/2006 23:00	0.284	0.246	0.277	
11/23/2006 23:00	0.285	0.247	0.278	

Date	Unit 1 30 day rolling average	Unit 2 30 day rolling average	Combined 30 day rolling average	Notes
11/27/2005 23:00	0.278	0.276	0.277	
11/28/2005 23:00	0.278	0.275	0.277	
11/29/2005 23:00	0.279	0.275	0.277	
11/30/2005 23:00	0.279	0.275	0.277	
12/01/2005 23:00	0.279	0.275	0.277	
12/02/2005 23:00	0.279	0.274	0.277	
12/03/2005 23:00	0.278	0.273	0.276	
12/05/2005 23:00	0.277	0.274	0.275	
12/06/2005 23:00	0.277	0.274	0.276	
12/07/2005 23:00	0.277	0.274	0.275	
07/01/2006 23:00	0.291	Off	0.291	Unit 1 only
07/02/2006 23:00	0.299	Off	0.299	Unit 1 only
07/03/2006 23:00	0.301	Off	0.301	Unit 1 only
07/04/2006 23:00	0.293	0.361	0.318	
09/05/2006 23:00	0.282	Off	0.282	Unit 1 only
09/06/2006 23:00	0.282	Off	0.282	Unit 1 only
09/07/2006 23:00	0.282	Off	0.282	Unit 1 only
09/08/2006 23:00	0.281	Off	0.281	Unit 1 only
09/09/2006 23:00	0.280	Off	0.280	Unit 1 only
09/10/2006 23:00	0.280	Off	0.280	Unit 1 only
09/11/2006 23:00	0.280	Off	0.280	Unit 1 only
09/12/2006 23:00	0.279	Off	0.279	Unit 1 only
09/13/2006 23:00	0.277	Off	0.277	Unit 1 only
09/14/2006 23:00	0.276	Off	0.276	Unit 1 only
09/15/2006 23:00	0.275	Off	0.275	Unit 1 only
12/19/2006 23:00	0.285	0.257	0.279	

Date	Unit 1 30 day rolling average	Unit 2 30 day rolling average	Combined 30 day rolling average	Notes
11/24/2006 23:00	0.284	0.246	0.277	
11/25/2006 23:00	0.284	0.247	0.277	
11/26/2006 23:00	0.284	0.247	0.277	
11/27/2006 23:00	0.284	0.247	0.277	
11/28/2006 23:00	0.284	0.247	0.277	
11/29/2006 23:00	0.285	0.246	0.278	
11/30/2006 23:00	0.285	0.245	0.277	
12/01/2006 23:00	0.283	0.244	0.276	
12/02/2006 23:00	0.284	0.243	0.276	
12/03/2006 23:00	0.285	0.241	0.277	
12/04/2006 23:00	0.286	0.239	0.276	
12/05/2006 23:00	0.287	0.240	0.278	
12/06/2006 23:00	0.288	0.242	0.279	
12/07/2006 23:00	0.289	0.243	0.280	
12/08/2006 23:00	0.288	0.242	0.279	
12/09/2006 23:00	0.288	0.241	0.278	
12/10/2006 23:00	0.287	0.242	0.278	
12/11/2006 23:00	0.287	0.242	0.278	
12/12/2006 23:00	0.287	0.243	0.278	
12/13/2006 23:00	0.286	0.243	0.277	
12/14/2006 23:00	0.285	0.244	0.277	
12/15/2006 23:00	0.286	0.245	0.278	
12/16/2006 23:00	0.287	0.248	0.279	
12/17/2006 23:00	0.286	0.251	0.279	
12/18/2006 23:00	0.285	0.254	0.278	

Date	Unit 1 30 day rolling average	Unit 2 30 day rolling average	Combined 30 day rolling average	Notes
12/20/2006 23:00	0.284	0.258	0.279	
12/21/2006 23:00	0.284	0.258	0.279	
12/22/2006 23:00	0.284	0.260	0.279	
12/23/2006 23:00	0.285	0.262	0.280	
12/24/2006 23:00	0.286	0.264	0.281	
12/25/2006 23:00	0.286	0.265	0.281	
12/26/2006 23:00	0.286	0.268	0.282	
12/27/2006 23:00	0.287	0.269	0.283	
12/28/2006 23:00	0.287	0.267	0.283	
12/29/2006 23:00	0.287	0.265	0.282	
12/30/2006 23:00	0.286	0.264	0.281	
12/31/2006 23:00	0.286	0.264	0.281	
01/01/2007 23:00	0.285	0.263	0.28	
01/02/2007 23:00	0.285	0.263	0.28	
01/03/2007 23:00	0.284	0.263	0.279	
01/04/2007 23:00	0.283	0.263	0.278	
01/05/2007 23:00	0.282	0.261	0.277	
01/06/2007 23:00	0.281	0.26	0.275	

Date	Unit 1 30 day rolling average	Unit 2 30 day rolling average	Combined 30 day rolling average	Notes

Data Notes:

1. Data source: Centralia Plant Data Acquisition Handling System (DAHS)
2. Only 40 CFR Part 75 “quality assured” data used to compute 30-day rolling average
3. No Acid Rain substitution data included in 30-day rolling average

TABLE 6
Centralia Flex Fuel Project – Estimated Capital Costs (Nov. 2008)

Boiler Water Cannons and Restoration of 8 Sootblowers

Boiler Water Cannons (Hydro Jets)	Material	\$1,903,007
	Labor and other	\$7,365,122
Boiler Sootblower (Existing) Restoration		\$540,534

Boiler Water Cannons and Restoration of 8 Sootblowers Total \$9,808,663

Boiler Pressure Parts & New Sootblowers

Material – Sootblowers	\$1,777,000
Material – Pressure Parts	\$41,413,074
Labor and other	\$48,809,926

Flex Fuel Boiler Pressure Part and New Sootblowers Total \$92,000,000

Total Flex Fuel Project Cost	\$101,808,663
Annualized Cost (15 yr. amortization @7% interest)	\$11,178,000